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дання податкових пільг і дотацій (субсидій, компенсацій) організаціям, що розробляють нормативно-методичну та інформаційну базу забезпечення проектів енергозбереження на різних рівнях управління; підприємствам-виробникам енергоефективного обладнання; споживачам, які розробили і впроваджують енергоефективні заходи та реалізують енергоефективні проекти; підприємствам, що зайняті оснащенням виробництва приладами обліку і контролю витрат.

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A CONCEPTUAL MODEL OF THE OPTIMAL UNDERWRITING CONTRACT CHOICE BY THE ISSUER DEVELOPING

Abstract. *In light of the research objective, this paper analyzes the dynamics and the structure of the executed contracts under the underwriting conduction in Ukraine in 2008-2012, as well as it determines the estimation intervals of banks' efficiency as the investment services providers (according to the dynamics of the issuers' share prices during the «period of silence»).*
The major result of this research is separation of the «efficient IBS market» and determination at which of the underwriting models (based on the «firm commitment» of the bank – model «FC», or «maximum/best efforts» of the bank – model «BE») as one of the leading investment services the offering efficiency is higher, and therefore it is more suitable for using by issuers for the domestic or foreign stock markets entering. The analysis was conducted by using the elements of the matrix theory of games.
The authors draw conclusions on selection of the priority underwriting model, as well as the time of application by the bank maximum market-maker's (marketing) efforts to promote market-placed securities.
Keywords: *underwriting; «firm commitment» model; «best efforts» model; investment banking services market; issuer of securities; contract.*
JEL Classification: *G20*

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ПОБУДОВА КОНЦЕПТУАЛЬНОЇ МОДЕЛІ ВИБОРУ ЕМІТЕНТОМ ОПТИМАЛЬНОГО КОНТРАКТУ АНДЕРРАЙТИНГУ

Анотація. У статті проведено порівняльний аналіз ринку інвестиційних банківських послуг (на прикладі послуг андеррайтингу). Визначено, яка із моделей андеррайтингу – на основі «твердих зобов'язань банку» («firm commitment – FC)» чи «максимальних/найкращих зусиль банку» (best efforts – BE)» – забезпечує вищу ефективність розміщення акцій і, відповідно, більше пристосована для використання українськими емітентами при виході на вітчизняні або зарубіжні фондові майданчики. На основі теорії матричних ігор сформульовано алгоритм маркетингового дослідження ринку, за результатами якого керівництво банку може прийняти обґрунтоване рішення щодо пріоритетності для емітента цінних паперів оптимального контракту андеррайтингу.
Ключові слова: андеррайтинг, модель «твердих зобов'язань», модель «найкращих зусиль», ринок інвестиційних банківських послуг, емітент цінних паперів, контракт.

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ПОСТРОЕНИЕ КОНЦЕПТУАЛЬНОЙ МОДЕЛИ ВЫБОРА ЭМИТЕНТОМ ОПТИМАЛЬНОГО КОНТРАКТА АНДЕРРАЙТИНГА

Аннотация. В статье проведен сравнительный анализ рынка инвестиционных банковских услуг (на примере услуг андеррайтинга). Определено, какая из моделей андеррайтинга – на основе «твердых обязательств банка» – «firm-commitment (FC)» или «максимальных/лучших усилий банка» – «bestefforts (BE)» – обеспечивает более высокую эффективность размещения акций и, соответственно, в большей степени приспособлена для использования украинскими эмитентами при выходе на отечественные или зарубежные фондовые площадки. На основе теории матричных игр сформулирован алгоритм маркетингового исследования рынка, на основе которого руководство банка может принять обоснованное решение относительно приоритетности для эмитента ценных бумаг формы контракта андеррайтинга.

Ключевые слова: андеррайтинг, модель «твердых обязательств», модель «лучших усилий», рынок инвестиционных банковских услуг, эмитент ценных бумаг, контракт.

Introduction. Looking for the cheapest and most convenient sources of the large projects financing by the major domestic companies leads to a gradual increase in demand for investment banking services (IBS), including the services of banks as underwriters. Therefore, the issue of conclusion a contract between the issuer of securities and a bank, which would maximize the benefits of both sides from operations within the initial public offering (IPO), is extremely important and requires detailed academic research.

Brief Literature Review. The problem of the contractual relationship between the investment bank and the issuer during the shares placement on the stock exchange at various times was been the subject of research of many experts, among which we can highlight the works: Baron (1979) [1], Baron and Holmstrom (1980) [2], Ibbotson (1975) [3], Mandelker & Raviv (1977) [4]. The findings of these authors, in turn, were based on the scientific results of the theory of agency highlighted in the works of authors: Green (1973) [5], Myerson (1979) [6], Harris (1979) [7] and others.

Most of these works contain a description of general and / or empirical studies of the specific demand generation by agents for certain groups of economic goods, including underwriting services under the company placement on the stock market. Thus, D. Baron (1979) [1] describes the characteristics of the optimal contract for banking services in advising and distribution of shares, building a model on the factors that have an impact before the date of the initial listing of the shares on the stock exchange. In our opinion, it would be appropriate to analyze agents market behavior after the date of first listing.

Thus, the key **purpose** of the study in this paper is the separation of the «efficient IBS market» and determine at which of the underwriting models (based on the «firm commitment» of the bank – model «FC», or «maximum/best efforts» of the bank – model «BE») the offering efficiency is higher and therefore it is more suitable for using by issuers for entering the domestic or foreign stock markets.

Results. The last phase of the IPO – current liabilities for exchange listing and increase in the capitalization of the issuer (Ernst & Young, 2013) [8], – requires from the investment bank (global syndicate manager etc.) and its partners application not less effort than before the time of offering the customer's shares on the stock. Accordingly, the conclusion of the optimal under writing contract is extremely important given the need to ensure:

1) for the bank – keeping the value of shares within a certain price range (usually this case is achieved by using of two instruments – the establishment of a moratorium on the shares sale over a certain period by the majority shareholders and acquisition of the «over allotments» option by the investment bank);

2) for the issuer – maximizing the value of the issued shares (its certain growth rate over a certain period);

3) for regulator of the investment banking services market (IBS market) – maintaining a stable market conjuncture over a certain period.

The last problem can be solved, among other measures, by providing the regulator's oversight for the completeness and quality of contracts' performance in accordance to the financial institutions' liabilities of the underwriting conduction. For example, in Ukraine the quarter-average value of contracts under the underwriting conduction (on the domestic stock markets) declined during 2008-2010, but in 2011 it was UAH 2186.85 million (USD/UAH=8.23), which is almost three times more than the similar indicator of 2010 (Figure 1). In the fourth quarter of 2012 this value reached a peak to UAH 6432.27 million.

Having the ability to track the dynamic implementation of underwriting contracts in terms of quantity/volume, on the one hand, and signed/executed agreements – on the other hand, we construct Table 1. Analysis of this table shows a significant increase in the average market value of the executed contracts under the underwriting conduction in Ukraine: in the first quarter of 2011 it amounted to UAH 0.83 million. In the fourth quarter of 2012 it was UAH 7.47 million. However, it was observed the minimum amount of the completed contract under the underwriting conduction (for about UAH 500 thousand) in the third quarter of 2011.

For the purpose of analysis it was used the amount of data on the dynamics of the value of shares placed by Ukrainian issuers abroad during the IPO since the receipt of the first quotation on the stock exchange.

First, we held the normalization (reduction to comparable values) of the market data by counting a stock price growth relative to a base – the stock price on the first day of exchange trading. The data are grouped according to two models of underwriting (including 12 IPOs, which could be clearly identified by the information on the applicable model contract bet-

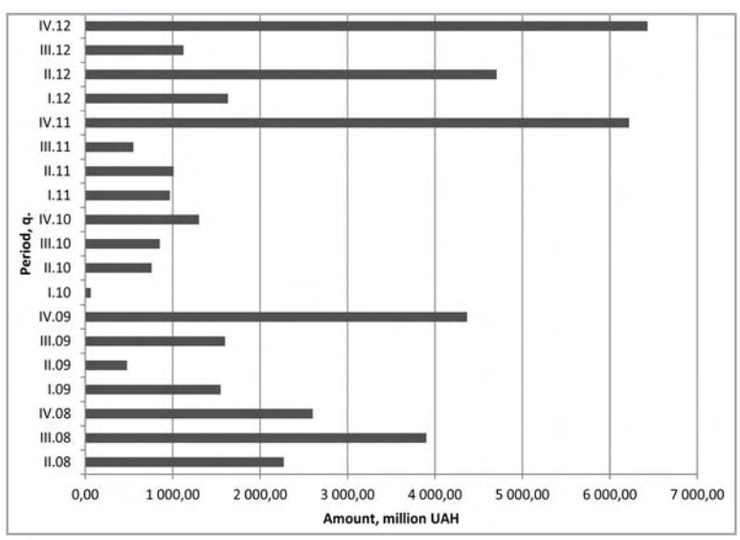

Fig. 1: **Total amount of completed contracts under the underwriting conduction in Ukraine in 2008-2012 (for the quarter), UAH million**
Source: Materials provided by the National Securities and Stock Market Commission (NSSMC) [8]

Tab. 1: **Analysis of the structure of completed contracts under the underwriting conduction in Ukraine in 2011-2012** (for the quarter)

Period		Total number of concluded contracts	The total amount of contracts, UAH million	Total number of executed contracts	The total amount of executed contracts, UAH million	Percentage of the contracts execution by number, %	Percentage of the contracts execution by the total amount, %	Cost of one executed contract, UAH million
2011	I q.	1 220	999.78	1 160	968.00	95.1	96.8	0.83
	II q.	1 412	1 023.34	1 360	1 009.86	96.3	98.7	0.74
	III q.	1 213	1 092.65	1 097	549.95	90.4	50.3	0.50
	IV q.	1 369	7 808.49	1 257	6 219.60	91.8	79.7	4.95
2012	I q.	934	2 267.18	883	1 632.58	94.5	72.0	1.85
	II q.	877	4 776.51	840	4 705.94	95.8	98.5	5.60
	III q.	1 022	1 121.60	1 022	1 121.60	100.0	100.0	1.10
	IV q.	877	6 825.59	861	6 432.27	98.2	94.2	7.47

Source: Materials provided by the National Securities and Stock Market Commission (NSSMC) [8]

ween the bank and the issuer) while finding the average market value for each of them. The results of the calculations are presented in Table 2.

Each reference date, at which the stock price was monitored, meets the conditions established in the context of generally accepted international practice of the IPO management.

Thus, the «silence period» should be considered as the length of time that usually begins within 30 calendar days prior to the placement of securities and ending 40 days after the shares allocation on the stock exchange. Under U.S. law, the time frame of this period is a date of filing the registration statement by the issuer to the American Securities and Exchange Commission (SEC), the time of its completion is a date the Commission recognizes the legitimacy of this proposal (effective), but not before 40 days after the start of trading on the exchange. During the silence period it is not permitted to disclose information that might encourage investors to buy shares, or if this information is untrue (especially it is not in the investment memorandum – «prospectus»). This information should be classified as statements regarding: new agreements signed by the company in the quarter during which securities are placed, changes in management, threats to the strategic objectives of the company, changes in the line of products, offers to take part in a business partnership and other.

The curves reflecting the price changes for shares placed by the issuers (average values for groups formed by the criterion of underwriting model specified in the contract between the bank and the issuer) during the analyzed time period are demonstrated in Figure 2.

As we can see from the Figure 2, the segment (submarket) of IBS market, determined by the criterion of using the «BE» contract model, showing relatively better than the segment of the «FC» contract model. However, even stocks, placed within the first submarket, on the 365th day after the date of initial offering have relevant quotations on average lower than 100.0% of the nominal value specified in the prospectus.

The indicated trend in general may indicate unwillingness of the bank as an organizer for placing into the «firm commitment» agreement (FC) to make the same amount (same quality) of distribution efforts, as into the «best-effort» contract (BE). This behavior may be due to fears of inflated value of securities to be purchased in case of failure of the market investors from the proposed shares (fully or partially).

The first point among the mentioned above motivations for the underwriting contract optimizing concerns the saving of the placed shares' cost after the «period of silence» within a certain range (the growth rates of the share prices are taken for comparison). The common practice of the investment banking sets the optimal growth rate of the share prices in a range 5.0-15.0%. Rising above this range indicates an under pricing of shares by the bank, and fall to the negative level indicates their overpricing.

On the basis of the accumulated data on the majority of the IPQ held by domestic issuers (in recent years), we'll conduct a comparative analysis of their stock price dynamics according to Tables 2-3.

The analysis of the share value at the 40-th day of their presence in the stock exchange listing indicates that the target range (5,0-15,0% growth rate) was achieved for share prices

Tab. 2: **Normalization, grouping and finding the average market value for the price data in respect of shares placed by domestic companies during the IPO**

Company name (IPO)	Issuer strategies	Date of the first listing	Number and name of the market strategy						
			1	2	3	4	5	6	7
			strategy of a speculative growth	strategy of income fixing / postponing	Strategy of response for stabilization measures	Strategy of responding to the report of the underwriter	Trading strategy after a period of silence	Trading strategy after the moratorium period	Strategy of responding to statements of the issuer
The i-th calendar day after the date of initial placement		**1**	**7**	**25**	**40**	**60**	**90**	**180**	**365**
«Agroton PLC»	BE	100.00	107.25	111.30	107.07	130.72	142.16	105.41	79.06
«Continental Farmers Group PLC»	BE	100.00	100.00	101.69	100.00	100.00	105.08	83.05	76.27
«Dragon Ukrainian Properties & Development»	BE	100.00	140.22	134.62	129.27	137.35	122.31	132.12	118.10
«Ovostar Union N.V.»	BE	100.00	87.14	94.69	77.81	98.79	96.30	111.01	144.69
«Sadovaya Group»	BE	100.00	125.29	113.51	116.86	102.49	122.61	107.28	79.12
On average, by the group	**BE**	**100.00**	**111.98**	**111.16**	**106.20**	**113.87**	**117.69**	**107.77**	**99.45**
«Astarta Holding N.V.»	FC	100.00	94.74	96.26	98.37	100.00	92.11	85.16	91.05
«Avangardco Investments PLC»	FC	100.00	100.00	89.29	92.86	89.29	92.86	100.00	135.00
«Cadogan Petroleum PLC»	FC	100.00	94.74	84.34	65.26	47.63	48.55	13.03	5.20
«Industrial Milk Company S.A.»	FC	100.00	96.83	103.17	100.45	92.76	94.03	73.67	101.72
«Kernel Holding S.A.»	FC	100.00	100.38	125.00	141.25	127.08	154.17	145.67	52.92
«MHPS.A» (PJSC «Myronivskyi khliboprodukt»)	FC	100.00	109.77	114.81	112.56	109.60	92.42	29.62	32.58
«Milkiland N.V.»	FC	100.00	107.28	124.52	121.86	113.86	116.63	104.28	39.43
On average, by the group	**FC**	**100.00**	**100.53**	**105.34**	**104.66**	**97.17**	**98.68**	**78.77**	**65.42**

Source: Calculated by the author based on the statistics for data exchange based on reporting companies

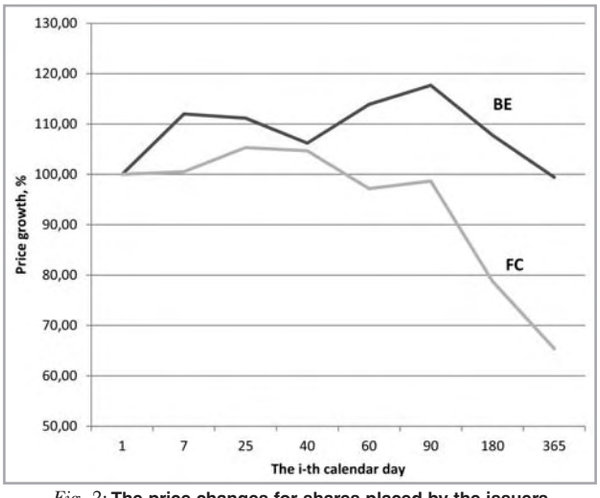

Fig. 2: **The price changes for shares placed by the issuers during the one year from the date of first listing**
Source: Calculated by the author based on data exchange statistics

from such IPO (5 out of 20 analyzed): «Agroton PLC», «Bank Forum JSC», «KSG Agro S.A.» and «TMM Real Estate Development PLC». Lead managers (investment advisers) of these issues were, respectively, «Phoenix Capital Limited», «The Bank of New York», «Dom Maklerski BZWBK S.A.», «Morgan Stanley» (together with «UBS Investment Bank») and «Concorde Capital».

Generally the next assessment intervals can be identified:

1. (-∞; 5) – over pricing of shares (measures used by investment banks for share promotion are ineffective) – for 10 placements;

2. [5, 15] – an optimal estimate of shares (measures used by investment banks for share promotion are effective) – for 5 placements;

3. (15; +∞) – under pricing of shares (measures used by investment banks for share promotion are ineffective) – for 5 placements.

For further analysis we use some elements of the theory of matrix games. For this reason, the company-issuer is denoted as a «Player A», and at the same time the market (the group of investors) is denoted as a «Player B». Thus, rounding values to integers, we consider a specific matrix with a dimensionality *2 x 7* and the following parameters:

$$A = \begin{pmatrix} 112 & 111 & 106 & 114 & 118 & 108 & 99 \\ 101 & 105 & 105 & 97 & 99 & 79 & 65 \end{pmatrix}$$

Since the lower and upper price of the game are equal to each other with a value of *99,* then this game has a saddle point, and therefore should be chosen a pure strategy *(A_1, B_7).* These strategies are optimal in the sense that in a case of the frequent game repetition rejection of the strategy, chosen by any player, reduces his chances of winning (increases his chances of losing). This statement should be explained in detail.

Initially, we'll analyze the game on the presence of a saddle point. For this reason, we consider the ***actions of a Player A***. In each row of the matrix A there is a minimal element, which in this case is:

$$\alpha_1 = 99, \quad \alpha_2 = 65, \ (\alpha_i = \min_k a_{ik}; \quad i = \overline{1,2}; \quad k = \overline{1,7})$$

Among the numbers α_1, α_2 we choose the maximum one: $\alpha = \max_i \alpha_i$. In our case $\alpha_1 = 99$, and thus $\alpha = \max_i \min_k a_{ik} = 99$ is the lowest price of the game. The principle of construction of a Player's A strategy is based on maximizing the minimum bending (win) of the game and called the max and min principle, and appropriate strategy A_i^* is a max and min strategy for Player A.

Actions of a Player B. Each row of the matrix A includes a maximal element:

$$\beta_k = \max_i a_{ik}; \quad i = \overline{1,2}; \quad k = \overline{1,7}$$

We have $\beta_1 = 112, \beta_2 = 111, \beta_3 = 106, \beta_4 = 114, \beta_5 = 118, \beta_6 = 108, \beta_7 = 99$. Among the numbers β_k, $k = \overline{1,7}$ we choose the minimum one: $\beta = \min_k \beta_k$, or, equivalently, $\beta = \min_k \max_i a_{ik}$. The number β is the upper price of the game, the principle of construction of a Player's B strategy is a min and max principle and strategy B_k^* is a min and max strategy.

Obviously, inequality $\alpha \le \beta$ is always satisfied. In our case the situation is equilibrium:

$$\min_k \max_i a_{ik} = \max_i \min_k a_{ik}$$

Strategies A_i^* and B_k^* are corresponding a saddle point are optimal, and the value $\alpha_{17} = 99$ is the game price. The economic interpretation of the results of matrix game can be summarized as follows:

1) at other things being equal issuers will tend to choose the «best efforts» contract with probability (99/(99+65))*100%, and the «firm commitment» contract with probability (65/(99+65))*100%;

2) at other things being equal the long-term (strategic) investors will tend to choose the time of entry into the market no earlier than 365 days after the date of initial placement.

In this situation, the bank is the third (outside) party, but it has an impact on the market due to the application of the appropriate amount of efforts on the one hand, and choosing a model of cooperation with the issuer on the other.

Tab. 3: **The average market value for the price data during the «period of silence» for certain domestic IPO**

Company name (IPO)	Date of the first listing	The i-th calendar day after the date of initial placement		
		40	60	90
«Agroliga Group PLC»	100.00	91.73	84.44	72.01
«Coal Energy S.A.»	100.00	104.17	117.19	128.33
«Epam Systems»	100.00	124.36	155.71	129.14
«KSG Agro S.A.»	100.00	113.61	98.55	89.96
«TMM Real Estate Development PLC»	100.00	109.10	111.42	112.02
«Westa ISIC S.A.»	100.00	91.58	64.17	71.92
«Bank Forum JSC»	100.00	114.77	133.85	160.92
«Stirol ADR»	100.00	95.61	94.63	68.29
On average	**100.00**	**105.62**	**107.50**	**104.07**

Source: Calculated by the author based on data exchange statistics

Conclusion. Thus, a bank conducting marketing researches of the domestic IBS market by using the model described above, has the ability to: select priority model of the underwriting contract (in this case bank choose application of the «best efforts»), to determine the time of application of the maximum market-maker efforts for promotion of the placed securities on a market (in this case it is not earlier than one year from the start of exchange trading by the relevant tool).

However, a situation where $\alpha = \beta$, which is the lower price of the game, is equal to the upper price of the game, does not occur often. This fact serves as a basis for a further research in this direction.

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